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Report to the Chairmen, Senate and House Committees on Armed Services

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# MEDICAL ADP SYSTEMS

# Composite Health Care System: Defense Faces a Difficult Task

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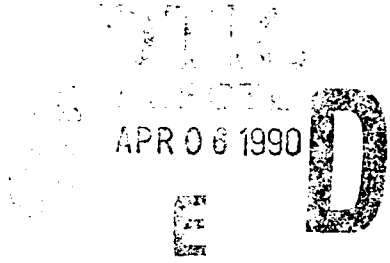


The Honorable Sam Nunn
Chairman, Committee on Armed Services
United States Senate

The Honorable Les Aspin
Chairman, Committee on Armed Services
House of Representatives

The Composite Health Care System (CHCS) is a state-of-the-art, integrated medical information system the Department of Defense is considering for its 767 medical treatment facilities worldwide. As required by the National Defense Authorization Act for Fiscal Years 1988 and 1989, we have been monitoring Defense's operational test and evaluation (OT&E) of this system. Defense plans to use OT&E results and related cost/benefit analyses to decide whether CHCS should be procured and how it should be deployed. That decision is scheduled for October 1990.

The Congress established specific CHCS operational testing and reporting requirements in the act. It requires that Defense conduct OT&E at no fewer than six sites and report the results to the Senate and House Armed Services Committees. According to a Defense directive, OT&E's purpose is to ensure that only operationally effective and suitable systems are deployed. Such tests are needed to reduce acquisition risks and ensure that systems meet technical and operational requirements.

Our objectives were to (1) determine whether Defense will be able to test and evaluate CHCS adequately before its planned procurement/deployment decision, (2) identify Defense's latest cost and funding estimates, and (3) evaluate the reasonableness of Defense's projected benefits. We visited Fort Knox, which serves as Defense's test site for new software development, and 6 of 11 OT&E sites; met with Defense and contractor representatives; and reviewed government and contractor documents. We conducted our evaluation from July 1989 to March 1990, in accordance with generally accepted government auditing standards. Appendix I details our objectives, scope, and methodology.

This status report discusses Defense's progress in the OT&E phase of this system's development. Our final report, as required by legislation, will be issued 30 days after the Armed Services Committees receive Defense's report on the results of OT&E.

## Results in Brief

Defense faces a difficult task in completing an adequate OT&E before its planned October 1990 procurement/deployment decision. As of February 1990, Fort Knox was the only CHCS site where a fully integrated system was operational. Defense's current plans are to deploy, test, and evaluate fully the CHCS system at six additional OT&E sites before making its decision. These sites are to become fully operational between April and June 1990. This will permit 4 to 6 months of operation and evaluation before October 1990 instead of the 8 months Defense had said, in February 1989, were needed. Defense officials are confident this will provide sufficient time to test the system and determine if it will meet technical and operational requirements. We believe Defense's current test schedule is extremely tight and leaves little room for slippage. Defense will need to monitor the OT&E closely to ensure that adequate information is obtained and that its test and evaluation is not driven by Defense's desire to complete OT&E by October 1990.

According to Defense's latest estimate, made in October 1989, life-cycle costs to deploy CHCS to its 767 medical facilities will be about $1.6 billion, or about $500 million more than the $1.1 billion congressional ceiling. Most of this increase, about $435 million, represents a Defense decision to extend the life of the system by 5 years. Defense plans, in its fiscal year 1991 budget, to request that the Congress raise the ceiling to $1.6 billion to cover all CHCS costs.

The CHCS program office estimates that, based on current congressionally-approved funding of $740 million, Defense will be able to deploy the system to only about one-half of its 767 hospitals and clinics. However, even these estimates on deployment may be optimistic because the Defense Inspector General reported, in 1989, that about $27 million, that were approved for Army and Navy use in deploying CHCS, have been reprogrammed for other purposes. We have not analyzed the appropriateness of this reprogramming.

Defense's projected dollar benefits for CHCS total more than $2 billion. The benefits are based on deployment to all 767 medical facilities. Defense's CHCS-benefit study showed that about 95 percent of the benefits expected from CHCS are expected to occur in the CHAMPUS program. These projections assume that CHCS will improve the availability and timeliness of patient information, reduce unnecessary repeat visits, and eliminate duplicate tests. According to Defense, this will allow physicians and nurses more time to treat additional patients. Thus, some patients who are now referred to civilian medical facilities under CHAMPUS would, instead, be treated at a military facility.

We have concerns as to whether Defense will be able to realize the projected CHAMPUS benefits. While CHCS may allow facilities to treat more patients, current CHAMPUS regulations allow beneficiaries to get outpatient care from civilian hospitals and physicians without Defense's approval and regardless of whether the military facility has excess capacity. Additionally, the benefit study did not consider restrictions on the number of patients specialists may treat during a given period. For example, the Naval Medical Command limits obstetricians to 20 deliveries a month. In the area served by a certain Naval hospital, this change alone increased the average monthly CHAMPUS-paid obstetrics cases from 47 to 347.

Defense agrees that estimating CHCS benefits is difficult and is in the process of refining the cost/benefit analysis that will be submitted to the Congress at the conclusion of OT&E.

## Background



CHCS is a state-of-the-art, integrated, medical information system Defense is testing for implementation at its medical treatment facilities. On the leading edge of technology and beyond the capabilities of systems commercially available, CHCS is designed to improve the timeliness, availability, and quality of patient-care data. It will replace manual and automated information systems now supporting Defense medical treatment facilities. At individual hospitals, it will integrate the functional work centers of inpatient and outpatient care facilities, patient administration, patient appointment and scheduling, nursing, laboratory, pharmacy, radiology, and clinical dietetics. CHCS is intended to provide physicians with immediate access to patient medical records.

Congress established specific CHCS operational testing and reporting requirements in the fiscal year 1988-1989 National Defense Authorization Act. The act requires that Defense

- conduct OT&E at no fewer than six sites, and
- submit a report to the Senate and House Armed Services Committees that evaluates OT&E results, analyzes CHCS costs and benefits, and contains a deployment plan based on the cost/benefit analysis.

Office of Management and Budget Circular A-109 and Defense guidance require that OT&E be conducted in an operationally-realistic environment. OT&E should determine whether a system (1) will meet and satisfy operational requirements and mission needs, and (2) can be deployed on schedule. The Office of Health Systems Evaluation, within the Office of

the Secretary of Defense, is conducting the OT&E for CHCS. Details on OT&E in major acquisitions are discussed in appendix II.

In early 1988, after evaluating system demonstrations and proposals from competing contractors, Defense awarded Science Applications International Corporation a contract to develop, test, deploy, and support CHCS. Fort Knox served as the test site at which the contractor demonstrated its ability to implement CHCS and continues to operate as a test site for new software. As part of the contract, Defense first planned to deploy and test the system at nine additional sites—seven in the continental United States, one in Europe, and one in the Pacific.

Because of our concern that the nine test sites did not fairly represent Defense medical facilities, which range in size from small clinics to hospitals with over 500 beds, Defense expanded the number of OT&E sites in February 1989.[1] Two large (Walter Reed and Bethesda) and two small (Carswell and Shaw) hospitals were added. At that time, Defense expected to complete OT&E at Fort Knox and the 13 sites by August 1990.

In February 1990, as a result of schedule slippage and in response to concerns we raised during this review, Defense postponed its procurement/deployment decision until October 1990. In addition, because of physical limitations in the Bethesda computer facility and budgetary constraints relating to Carswell, Defense dropped these two sites from OT&E testing. The 12 currently active test sites are listed in appendix III. Further, Defense decided to focus its test and evaluation efforts at seven sites—Fort Knox and six additional OT&E sites: Charleston, Eglin, Jacksonville, Nuernberg, Sheppard, and Tripler.

During the early stages of OT&E, Defense has used its Fort Knox site to develop and test CHCS software and formulate an approach to determine whether anticipated benefits will be realized. Beginning in April 1990, Defense plans to begin deployment and operation of CHCS at the six other OT&E sites. Additionally, Defense will be testing at Shaw, primarily, to determine the cost-effectiveness of deploying at small facilities.

[1] Medical ADP Systems: Composite Health Care System Operational Tests Extended (GAO/IMTEC-89-30, Apr. 10, 1989).

## Defense Faces a Difficult Task in Completing an Adequate OT&E by October 1990

Originally scheduled for completion in September 1989, OT&E is now scheduled to be finished in October 1990. In February 1989, when Defense first extended OT&E, system implementation and user training were expected to be completed at 13 test sites by December 1989. That schedule would have allowed about 8 months to complete the OT&E—3 months for system stabilization and 5 months to complete testing, evaluation, and reporting. Defense officials maintained that this time was needed to reduce the government's risk, as the additional time would allow more time to test the system and allow for routine use at the 13 sites before a deployment decision. They also maintained that gathering data from more experienced users would improve their ability to demonstrate system benefits.

As shown in table 1, Defense has implemented the integrated system at Fort Knox. Defense plans to have the integrated system implemented and to test and evaluate it for 4 to 6 months at six additional sites by October 1990.

**Table 1: CHCS Test Site Implementation Schedule as of February 1990**

| Test site | Hospital beds | Clinical visits | Scheduled implementation of integrated system |
|---|---|---|---|
| Fort Knox [Kentucky][a] | 195 | 621,423 | May 1989 |
| Charleston [South Carolina] | 184 | 359,576 | Apr 1990 |
| Eglin [Florida] | 145 | 446,431 | Apr 1990 |
| Jacksonville [Florida] | 178 | 570,706 | Apr 1990 |
| Nuernberg [West Germany] | 142 | 519,309 | May 1990 |
| Sheppard [Texas] | 135 | 247,285 | May 1990 |
| Tripler [Hawaii] | 479 | 1,573,369 | Jun 1990 |
| Shaw [South Carolina] | 40 | 174,006 | Sep 1990 |
| Eisenhower [Georgia] | 384 | 650,034 | Dec 1990 |
| Keesler [Mississippi] | 295 | 442,368 | Dec 1990 |
| Walter Reed [Washington, D.C.] | 886 | 1,222,767 | Feb 1991 |
| LeJeune [North Carolina] | 170 | 364,264 | Feb 1991 |

[a]Test site for development and testing of software. Implementation is the actual date.

As currently planned, the integrated system will not be fully implemented at the largest facility, Walter Reed, and will be implemented for 1 month, prior to the completion of OT&E, at the smallest facility—Shaw. As stated earlier, Defense added these test sites to make its OT&E more

representative of its medical facilities. Testing at larger military hospitals, where the greatest difficulty is expected, would provide an opportunity to (1) fully stress the system, (2) validate the assumption that those facilities will derive the greatest benefits from the system, and (3) measure Defense's and the contractor's ability to implement the system at large facilities. A full operational test at the small site (Shaw) is not planned; instead, Defense will test CHCS at Shaw, primarily, to determine the cost-effectiveness of deploying CHCS to small facilities. The results of this test is important because these facilities represent about two-thirds of the hospitals in the military health care system.

Defense's current approach to testing a large hospital includes (1) a fully operational test at Tripler to stress system software and hardware, and (2) testing the contractor's ability to perform site preparation and initiate operational testing at Walter Reed. Tripler ranks among the 10 largest military hospitals in terms of hospital beds and clinical visits. OT&E at this site will include supporting personnel from all three military services and nine clinical sites in Hawaii. Because of the additional requirements imposed by the nine clinics, the Tripler test should be representative of the very largest medical facilities. Defense officials believe that these requirements will sufficiently stress the system and reduce the risk of deployment to the remaining large hospitals.

Defense's current schedule has reduced the time to perform and evaluate the operational tests from 8 months to 4-6 months. Compressing the time to test and evaluate CHCS system performance adds risk to Defense's ability to make a sound deployment decision and will require close Defense monitoring.

## Some CHCS Software Will Not Be Tested

Defense's current plans show that about 38 percent of system software will not be developed and deployed to the test sites by October 1990. This untested software will include some capabilities currently designated as high priority by the Surgeons General of the three services. For example, the human resource management component, which provides staffing, scheduling, teaching, and orientation for nurses will be untested, as will the transfusion-services-management component, which automates blood-test ordering, results entry, documentation, and inventory. Defense, as of February 1990, did not have specific dates for testing this software.

However, the program office estimates that the system software, which will have been tested by October 1990 will provide about 87 percent of

the projected dollar-valued benefits and about 79 percent of the system capabilities that the Surgeons General identified as high priority. Although we have not evaluated the accuracy of these estimates, we found that the system in operation at Fort Knox and scheduled for deployment to the OT&E test sites fully integrates such activities as patient appointment and scheduling, physician order entry, laboratory, radiology, and nursing. These activities cover a substantial portion of a hospital's activities.

Defense has coordinated software development and deployment with the Surgeons General, and the deployment of the remaining high-priority software is being discussed. Because of changes in the composition of the Surgeons General, there has been some shift in the order this remaining software should be developed.

## Estimated Costs Exceed Congressional Ceiling

Defense estimates CHCS life-cycle costs for full deployment to 767 medical facilities at $1.6 billion, or $500 million more than the $1.1-billion congressional ceiling. The congressional ceiling for CHCS was established in the Department of Defense Appropriations Act for fiscal year 1987 and has remained in effect in succeeding appropriations acts.

Defense guidance defines life-cycle costs as contract and in-house costs—development, procurement, operation, support, and where applicable, disposal. Table 2 shows Defense's estimate of total life-cycle costs through fiscal year 2002—the expected life of the system.

**Table 2: Defense's Estimate of Total CHCS Life-Cycle Costs in Fiscal Year 1986 Dollars**

(Dollars in millions)

| | Prime Contract costs | Other Government costs[a] | Total cost |
|---|---|---|---|
| Demonstration projects | $14.3 | $21.3 | $35.6 |
| Acquisition/contractor competition | 75.3 | 21.0 | 96.3 |
| Testing/deployment operations | 858.1 | 139.3 | 997.4 |
| **Subtotal** | **$947.7** | **$181.6** | **$1,129.3** |
| Extend life cycle[b] | 381.7 | 52.9 | 434.6 |
| **Total** | **$1,329.4** | **$128.0** | **$1,563.9** |

[a]Includes such costs as government personnel, increased power and air conditioning, and system upgrades.

[b]In a March 1988 project review, Defense decided to extend the life cycle for CHCS from 10 to 15 years and provide for mid-life, technology enhancements.

CHCS life-cycle costs for full deployment are expected to be $500 million more than the $1.1-billion congressional ceiling. While we have not evaluated the $500-million increase, Defense states that it is primarily the result of a decision to extend the project's life cycle by 5 years. As part of its fiscal year 1991 budget request to the Congress, the program office is requesting that the ceiling be raised to $1.6 billion to cover all costs.

## Projected Funding Inadequate for Worldwide Deployment

As of fiscal year 1990, the Congress has approved $740 million for the deployment of CHCS through fiscal year 1997. The $740 million is based on approved-service resources included in the Fiscal Year 1990-1994 Program Objective Memorandum and projected funding through fiscal year 1997. At that funding level, Defense now estimates that it will be able to deploy CHCS to only about one-half of its facilities. These facilities support about 57 percent of the services' inpatient care and 39 percent of outpatient care. Defense believes that the current funding level of $740 million would reduce benefits by about $500 million.

However, it is questionable whether Defense has $740 million available. The Army and Navy have reprogrammed about $27 million in CHCS funding to other areas. As of February 1990, for fiscal years 1992 through 1994, the Army reprogrammed $12 million in CHCS procurement funding. Also, the Navy reprogrammed $15 million it had planned to spend for CHCS procurement in fiscal years 1993 and 1994. Approved Navy procurement funding for these years was intended to deploy CHCS to 27 hospitals and clinics. We have not, however, analyzed the appropriateness of these reprogrammings.

## Expected Benefits Are Difficult to Estimate

Defense's projected dollar benefits for CHCS through fiscal year 1997 total more than $2 billion. The benefits assume full deployment to all 767 facilities and largely depend on reducing the costs of the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS). CHAMPUS pays for health care costs for families of uniformed services members who are unable to get care through a military hospital or clinic and receive medical services from private providers.

As shown in table 3, about 95 percent of the projected CHCS benefits are expected to occur in CHAMPUS. These projections assume that CHCS will improve the availability and timeliness of patient information, reduce unnecessary repeat visits, and eliminate duplicate tests, thereby,

increasing hospital capacity. According to Defense, this will allow military physicians and nurses more time to treat additional patients. Thus, patients who now receive care from civilian medical facilities under CHAMPUS could, instead, be treated at a military treatment facility.

**Table 3: CHCS Life-Cycle Benefits in Fiscal Year 1986 Dollars**

Dollars in millions

| Category | Methodology | Savings | Percent of savings |
|---|---|---|---|
| Inpatient care | CHAMPUS conversion | $1,216.8 | 58.9 |
| Outpatient care | CHAMPUS conversion | 742.2 | 35.9 |
| Other direct cost offsets | Spoilage reduction<br>Malpractice reduction<br>Medical claims increase<br>Eligibility enrollment expense reduction | 28.0 | 1.4 |
| Active-duty time savings | Decreased waiting time<br>Decreased prescription reactions | 66.2 | 3.2 |
| Non active-duty time savings | Decreased waiting time<br>Decreased prescription reactions | 13.2 | .6 |
| **Total** | | **$2,066.4** | **100.0** |

Defense developed a benefits analysis model to project potential savings that would accrue if some patients now being treated at private facilities were, instead, treated in a military facility. This model projects that CHCS efficiencies will reduce the average length of an inpatient stay by about 5 percent, thereby allowing the hospital to treat more patients.

We identified weaknesses in Defense's benefits study that raise questions regarding the ability of Defense to achieve the full extent of the projected CHAMPUS savings—even if deployed to all 767 medical facilities.

First, the projected benefits assume that hospitals and physicians would be more efficient after CHCS is implemented, and, thereby, have more time to treat patients who would otherwise be referred to CHAMPUS. However, CHAMPUS regulations allow care from civilian hospitals and physicians without Defense's approval and regardless of whether the military facility has excess capacity. Defense's projected benefits do not consider that patients can obtain inpatient care under CHAMPUS even though a military facility could treat them. For example, obstetrics and gynecology patients within the Jacksonville Naval Hospital area are not required to get their care at this hospital if they live more than 45 minutes driving time from the facility. This exemption was prompted by

highway and bridge traffic congestion frequently encountered in the Jacksonville area. For safety and medical reasons, patients in outlying geographical areas routinely use the CHAMPUS program and receive care in private hospitals closer to their homes.

Additionally, the projected benefits do not consider restrictions on the number of patients specialists may treat during a given period. For example, the Naval Medical Command limits obstetricians to 20 deliveries a month. In our July 1989 report on CHAMPUS[2], we noted that, primarily because of that limitation, average monthly deliveries for obstetricians at the San Diego Naval Hospital decreased from 37 in fiscal year 1985 to 18 in fiscal year 1987. Thus, total average monthly deliveries at the San Diego Naval Hospital decreased from about 400 to 200, while average monthly CHAMPUS-paid inpatient obstetrics cases for the area served by that hospital ballooned from 47 to 347. According to the CHCS program office, this restriction is being assessed to determine how it will affect benefit projections.

Defense is going to have difficulty in accurately estimating CHCS benefits by October 1990 for some of the reasons discussed above, and because it will likely take several years of experience to determine accurately CHCS's effect on CHAMPUS. Defense is aware of the difficulty and is in the process of further refining its estimates. Its updated cost/benefit analysis is to be included in the report it plans to provide to the Senate and House Armed Services Committees at the conclusion of its OT&E.

## Conclusion

CHCS has experienced delays in its development and planned OT&E schedule. We recognize that delays with the development of a state-of-the-art system, such as CHCS, are not uncommon. During the remainder of the OT&E, Defense plans to continue implementing CHCS at its test-site facilities. The progress made at these sites in demonstrating the system's ability to generate benefits will be critical in providing an adequate basis on which to base future deployment decisions. The worst thing that could happen would be to deploy prematurely and, then, find problems that preclude the system's meeting its goals.

Defense's current OT&E plans focus on demonstrating that CHCS can be deployed to and become fully operational at six sites. The current schedule calls for 4 to 6 months of operation and testing at these sites before

[2]Defense Health Care: Workload Reductions at Military Hospitals Have Increased CHAMPUS Costs (GAO/HRD-89-47, July 10, 1989).

the end of OT&E in October 1990. Meeting the objectives set forth in this schedule are critical to Defense being able to make an informed deployment decision and meet the legislative requirement that OT&E be conducted at six sites.

In our previous report, we recommended, and Defense agreed, that OT&E should include a full range of operational environments, including large and small military hospitals. Defense's current approach to testing CHCS at larger hospitals involves (1) stressing system hardware and software capabilities at Tripler and (2) testing contractor deployment capabilities at Walter Reed. The cost-effectiveness of deploying CHCS to smaller hospitals will be tested at Shaw for 1 month. While we are concerned about whether 1 month is adequate for Shaw, this approach appears to be reasonable and, if successful, should reduce the risk of a deployment to Defense's larger and smaller hospitals.

We recognize that accurately estimating system benefits is not easy. Estimating CHAMPUS benefits is a problem, since many factors are at work that may preclude Defense from getting good information on whether CHAMPUS patients will return in sufficient numbers to achieve the projected benefits. Further, congressionally-approved funding levels, facility deployment schedules, and the decisions regarding software not included in the OT&E will also have an impact on the accuracy of the benefit estimates. Defense agrees that it will be difficult, and it is in the process of further refining its estimates. The cost/benefit analysis required to be included in the OT&E evaluation report should, if properly done, provide the information needed to make an informed procurement/deployment decision.

We discussed the contents of this report with senior Defense officials, who generally agreed with our findings. We have incorporated their comments as appropriate.

We are sending copies of this report to the Chairmen of the House and Senate Committees on Appropriations; the Director, Office of Management and Budget; and the Secretary of Defense. Copies also will be made available to other interested parties upon request.

This work was performed under the direction of Daniel C. White, Special Assistant to the Assistant Comptroller General, who can be reached at (202) 275-4659. Other major contributors are listed in appendix IV.

Michael Gryzbowski

for Ralph V. Carlone
Assistant Comptroller General

# Contents

## Abbreviations

| | |
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| CHAMPUS | Civilian Health and Medical Program of the Uniformed Services |
| CHCS | Composite Health Care System |
| GAO | General Accounting Office |
| IMTEC | Information Management and Technology Division |
| OT&E | Operational Test and Evaluation |
| SAIC | Science Applications International Corporation |

# Objectives, Scope, and Methodology

The National Defense Authorization Act for Fiscal Years 1988 and 1989 requires that we (1) monitor the OT&E phase and related CHCS acquisition activities and (2) submit a report to the Senate and House Armed Services Committees evaluating OT&E results and Defense's contract award process for the CHCS procurement/deployment. This status report is one of a series of reports that we have issued dealing with Defense's acquisition and testing of this system.[1] As required by the act, our final report on CHCS OT&E, as required by legislation, will be issued 30 days after the Armed Services Committees receive Defense's report on the results of OT&E.

For this report, our objectives were to (1) determine whether Defense will be able to test and evaluate CHCS adequately before its planned procurement/deployment decision, (2) determine Defense's latest cost and funding estimates, and (3) evaluate the reasonableness of Defense's projected benefits.

We visited 6 of the 11 OT&E sites: Eglin, Eisenhower, Jacksonville, Keesler, Sheppard, and Walter Reed. We also visited Science Applications International Corporation, in Falls Church, Virginia, and the Defense Medical Systems Support Center (the program office managing the CHCS acquisition). We also visited the Army Medical Center at Fort Knox, Kentucky, where Science Applications International Corporation is conducting the initial testing for new CHCS software.

We worked closely with senior program management officials to (1) discuss our concerns as they arose, (2) confirm our understanding of potential problems and their implications for achievement of test objectives, and (3) permit them to respond to our observations. We briefed senior

[1] In previous reports, we examined issues pertaining to Defense's acquisition process. See ADP Systems: Concerns About the Acquisition Plan for DOD's Composite Health Care System (GAO/IMTEC-86-12, Mar. 31, 1986).

ADP Systems: Concerns About DOD's Composite Health Care System Development Contracts (GAO/IMTEC-87-25, June 8, 1987).

Medical ADP Systems: Composite Health Care System Operational Test and Evaluation Costs (GAO/IMTEC-88-18BR, Jan. 28, 1988).

Medical ADP Systems: Composite Health Care System Acquisition-Fair, Reasonable, Supported (GAO/IMTEC-88-26, Mar. 4, 1988).

Medical ADP Systems: Analysis of Technical Aspects of DOD's Composite Health Care System (GAO/IMTEC-88-27, July 11, 1988).

Medical ADP Systems: Composite Health Care System Operational Tests Extended (GAO/IMTEC-89-30, Apr. 10, 1989).

program management officials during our review and incorporated their views where appropriate.

# Operational Test and Evaluation in Major Defense Acquisitions

In response to growing congressional concerns about the risks associated with acquiring complex and costly medical ADP systems, the Assistant Secretary of Defense (Comptroller) in 1979 directed that the CHCS acquisition comply with Office of Management and Budget Circular A-109 acquisition guidelines. These guidelines instruct federal agencies on how to conduct a major system acquisition and minimize risks of inadequate system performance and excessive costs. The circular addresses all aspects of the acquisition process. Under the A-109 strategy, a full-scale test of a system is conducted to determine if it will perform effectively under operational conditions.

The director of OT&E within the Office of the Secretary of Defense has the responsibility to monitor and review all OT&E within Defense (10 U.S.C. 138). Systems to be tested include all major Defense systems acquisitions with estimated life-cycle costs greater than $1 billion (10 U.S.C. 2430). CHCS is a major system acquisition with projected life-cycle costs of more than $1 billion.

OT&E generally seeks to determine (1) whether a system will satisfy mission needs and is suitable for use by typical military users and (2) if Defense and the contractor developing the system are capable of deploying it on schedule. Although field testing of weapons systems is the primary application of OT&E, Defense believes that automated information systems, such as CHCS, require the same level of testing as do major weapons systems to determine their effectiveness and suitability in the environment in which they will operate. To reduce the risk of deploying a costly medical information system before it is adequately developed and tested, Defense recognizes that CHCS must be tested in a realistic operating environment before the system can be deployed throughout the military hospital system.

# CHCS OT&E Test Site Implementation Schedule as of February 1990

| Test site | Hospital beds | Site prep complete[a] | Scheduled implementation of integrated system |
|---|---|---|---|
| Fort Knox[b] | 195 | | May 1989 |
| Charleston[c] | 184 | August 1988 | April 1990 |
| Eglin[c] | 145 | August 1988 | April 1990 |
| Jacksonville[c] | 178 | July 1988 | April 1990 |
| Nuernberg[c] | 142 | September 1988 | May 1990 |
| Sheppard[c] | 135 | July 1988 | May 1990 |
| Tripler[c] | 479 | October 1988 | June 1990 |
| Shaw | 40 | May 1990 | September 1990 |
| Eisenhower | 384 | October 1988 | December 1990 |
| Keesler | 295 | July 1988 | December 1990 |
| Walter Reed | 886 | November 1989 | February 1991 |
| LeJeune | 170 | August 1988 | February 1991 |
| Bethesda[d] | 494 | | |
| Carswell[d] | 90 | | |

[a]Includes hardware installation.

[b]Defense began installing and testing CHCS in 1987 during the competition stage of the acquisition. It still serves as Defense's test site for new software development.

[c]In February 1990, Defense decided to focus its OT&E efforts on Fort Knox and these 6 test sites.

[d]Because of physical limitations in the Bethesda computer facility and budgetary constraints relating to Carswell, Defense dropped these two sites from OT&E testing.

# Major Contributors to This Report

| | |
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